

SEQUENCE LISTING

<110> GARCIA-CALVO, MARIA MARGARITA

<120> NPC1L1 (NPC3) AND METHODS OF IDENTIFYING LIGANDS THEREOF

<130> 059893-0121

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<170> PatentIn version 3.5

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<212> DNA

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Tyr Asn Gly Pro Asn Thr Thr Phe Ala Cys Cys Ser Thr Lys Gln Leu	
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Cys	Pro	Ala	Cys	Ser	Asp	Asn	Phe	Val	Ser	Leu	His	Cys	His	Asn	Thr	
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Gln	Arg	Ser	Phe	Ala	Glu	Lys	Ala	Tyr	Glu	Ser	Cys	Ser	Gln	Val	Arg	
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Gln	Asp	Cys	Ala	Ala	Ser	Cys	Pro	Val	Ile	Pro	Pro	Pro	Glu	Ala	Leu	
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Arg	Pro	Ser	Phe	Tyr	Met	Gly	Arg	Met	Pro	Gly	Trp	Leu	Ala	Leu	Ile	
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Ile	Ile	Phe	Thr	Ala	Val	Phe	Val	Leu	Leu	Ser	Ala	Val	Leu	Val	Arg	
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ctc acc gtc tta gca ctg tcc ttc atc gtt gtg ata gcc tta gca gca Leu Thr Val Leu Ala Leu Ser Phe Ile Val Val Ile Ala Leu Ala Ala 355 360 365	1104
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agg tcc agc tac aag tac gac tcc cta ctg cta ggg tcc aag aac ttc Arg Ser Ser Tyr Lys Tyr Asp Ser Leu Leu Leu Gly Ser Lys Asn Phe 420 425 430	1296
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gag agg ctt cga cac ctg caa gtg tgg tcc cct gag gca gag cgc aac Glu Arg Leu Arg His Leu Gln Val Trp Ser Pro Glu Ala Glu Arg Asn 450 455 460	1392
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cct ctc acg ttc aaa gat ggc acg tct ctg gcc ctg agc tgc atg gct Pro Leu Thr Phe Lys Asp Gly Thr Ser Leu Ala Leu Ser Cys Met Ala 530 535 540	1632

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Gly	Thr	Asp	Tyr	Ser	Glu	Ala	Glu	Ala	Leu	Ile	Ile	Thr	Phe	Ser	Leu	
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Asn	Asn	Tyr	Pro	Ala	Asp	Asp	Pro	Arg	Met	Ala	Gln	Ala	Lys	Leu	Trp	
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Glu	Glu	Ala	Phe	Leu	Lys	Glu	Met	Glu	Ser	Phe	Gln	Arg	Asn	Thr	Ser	
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Asp	Lys	Phe	Gln	Val	Ala	Phe	Ser	Ala	Glu	Arg	Ser	Leu	Glu	Asp	Glu	
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Tyr	Gln	Arg	Leu	Pro	Arg	Met	Pro	Gly	Glu	Gln	Arg	Glu	Ala	His	Ile	
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Arg	Gln	Glu	Ala	Ser	Arg	Pro	Asp	Val	Leu	Cys	Cys	Phe	Ser	Thr	Arg	
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Lys	Leu	Pro	Pro	Pro	Lys	Glu	Lys	Glu	Gly	Leu	Leu	Leu	Arg	Phe	Phe	
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Val	Met	Leu	Leu	Phe	Leu	Thr	Leu	Phe	Gly	Ala	Asn	Leu	Tyr	Leu	Met	
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Glu	Ala	Gly	Met	Asn	Ala	Thr	Cys	Ser	Ser	Ala	Gly	Cys	Lys	Ser	Phe	
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Tyr	Val	Ala	Ile	Ala	Ala	Ser	Ser	Trp	Val	Asp	Asp	Phe	Ile	Asp	Trp	
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Leu	Thr	Pro	Ser	Ser	Ser	Cys	Cys	Arg	Leu	Tyr	Ile	Arg	Gly	Pro	His	
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Lys	Asp	Glu	Phe	Cys	Pro	Ser	Thr	Asp	Thr	Ser	Phe	Asn	Cys	Leu	Lys	
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 Leu Leu Gly Leu Leu His Gly Leu Val Phe Leu Pro Val Val Leu
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 Ser Tyr Leu Gly Pro Asp Val Asn Gln Ala Leu Val Gln Glu Glu
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 Lys Leu Ala Ser Glu Ala Ala Val Ala Pro Glu Pro Ser Cys Pro
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Val Thr Gly Glu His Leu Ala Leu Leu Gln Arg Ile Cys Pro Arg Leu
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Tyr Asn Gly Pro Asn Thr Thr Phe Ala Cys Cys Ser Thr Lys Gln Leu
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Leu Ser Leu Glu Ser Ser Met Ser Ile Thr Lys Ala Leu Leu Thr Arg
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Cys Pro Ala Cys Ser Asp Asn Phe Val Ser Leu His Cys His Asn Thr
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Cys Ser Pro Asp Gln Ser Leu Phe Ile Asn Val Thr Arg Val Val Glu
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Arg Gly Ala Gly Glu Pro Pro Ala Val Val Ala Tyr Glu Ala Phe Tyr
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Gln Arg Ser Phe Ala Glu Lys Ala Tyr Glu Ser Cys Ser Gln Val Arg
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Gly Ser Ala Leu Cys Asn Ala Gln Arg Trp Leu Asn Phe Gln Gly Asp
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Thr Gly Asn Gly Leu Ala Pro Leu Asp Ile Thr Phe His Leu Leu Glu
210 215 220

Pro Gly Gln Ala Leu Pro Asp Gly Ile Gln Pro Leu Asn Gly Lys Ile
225 230 235 240

Ala Pro Cys Asn Glu Ser Gln Gly Asp Asp Ser Ala Val Cys Ser Cys
245 250 255

Gln Asp Cys Ala Ala Ser Cys Pro Val Ile Pro Pro Pro Glu Ala Leu
260 265 270

Arg Pro Ser Phe Tyr Met Gly Arg Met Pro Gly Trp Leu Ala Leu Ile
275 280 285

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Glu	Ala	Pro	Lys	Leu	Pro	His	Lys	His	Lys	Leu	Ser	Pro	His	Thr	Ile
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 Cys Ala Phe Tyr Asp Glu Cys Gly Lys Asn Pro Glu Leu Ser Gly Ser
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Cys	Pro	Ala	Cys	Ser	Asp	Asn	Phe	Val	Asn	Leu	His	Cys	His	Asn	Thr	
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tcg	tac	ctg	ctt	gac	tat	ttc	ctc	ttt	ctg	aac	cgc	tac	ttc	gag	gtg	2688
Ser	Tyr	Leu	Leu	Asp	Tyr	Phe	Leu	Phe	Leu	Asn	Arg	Tyr	Phe	Glu	Val	
				885					890					895		
ggg	gcc	ccg	gtg	tac	ttt	gtt	acc	acc	ttg	ggc	tac	aac	ttc	tcc	agc	2736
Gly	Ala	Pro	Val	Tyr	Phe	Val	Thr	Thr	Leu	Gly	Tyr	Asn	Phe	Ser	Ser	
			900					905					910			
gag	gct	ggg	atg	aat	gcc	atc	tgc	tcc	agt	gca	ggc	tgc	aac	aac	ttc	2784
Glu	Ala	Gly	Met	Asn	Ala	Ile	Cys	Ser	Ser	Ala	Gly	Cys	Asn	Asn	Phe	
		915					920					925				
tcc	ttc	acc	cag	aag	atc	cag	tat	gcc	aca	gag	ttc	cct	gag	cag	tct	2832
Ser	Phe	Thr	Gln	Lys	Ile	Gln	Tyr	Ala	Thr	Glu	Phe	Pro	Glu	Gln	Ser	
	930					935					940					

tac Tyr 945	ctg Leu	gcc Ala	atc Ile	cct Pro	gcc Ala 950	tcc Ser	tcc Ser	tgg Trp	gtg Val	gat Asp 955	gac Asp	ttc Phe	att Ile	gac Asp	tgg Trp 960	2880
ctg Leu	acc Thr	ccg Pro	tcc Ser	tcc Ser 965	tgc Cys	tgc Cys	cgc Arg	ctt Leu	tat Tyr 970	ata Ile	tct Ser	ggc Gly	ccc Pro	aat Asn 975	aag Lys	2928
gac Asp	aag Lys	ttc Phe	tgc Cys 980	ccc Pro	tcg Ser	acc Thr	gtc Val	aac Asn 985	tct Ser	ctg Leu	aac Asn	tgc Cys	cta Leu 990	aag Lys	aac Asn	2976
tgc Cys	atg Met	agc Ser 995	atc Ile	acg Thr	atg Met	ggc Gly	tct Ser 1000	gtg Val	agg Arg	ccc Pro	tcg Ser	gtg Val 1005	gag Glu	cag Gln	ttc Phe	3024
cat His	aag Lys 1010	tat Tyr	ctt Leu	ccc Pro	tgg Trp	ttc Phe 1015	ctg Leu	aac Asn	gac Asp	cgg Arg	ccc Pro 1020	aac Asn	atc Ile	aaa Lys		3069
tgt Cys	ccc Pro 1025	aaa Lys	ggc Gly	ggc Gly	ctg Leu	gca Ala 1030	gca Ala	tac Tyr	agc Ser	acc Thr	tct Ser 1035	gtg Val	aac Asn	ttg Leu		3114
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tcc Ser	att Ile 1145	gtc Val	atg Met	atc Ile	ctc Leu	gtg Val 1150	gac Asp	act Thr	gtc Val	ggc Gly	ttc Phe 1155	atg Met	gcc Ala	ctg Leu		3474

tgg gac atc agt tac aat gct gtg tcc ctc atc aac ctg gtc tcg	3519
Trp Asp Ile Ser Tyr Asn Ala Val Ser Leu Ile Asn Leu Val Ser	
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gcg gtg ggc atg tct gtg gag ttt gtg tcc cac att acc cgc tcc	3564
Ala Val Gly Met Ser Val Glu Phe Val Ser His Ile Thr Arg Ser	
1175 1180 1185	
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Phe Ala Ile Ser Thr Lys Pro Thr Trp Leu Glu Arg Ala Lys Glu	
1190 1195 1200	
gcc acc atc tct atg gga agt gcg gtg ttt gca ggt gtg gcc atg	3654
Ala Thr Ile Ser Met Gly Ser Ala Val Phe Ala Gly Val Ala Met	
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acc aac ctg cct ggc atc ctt gtc ctg ggc ctc gcc aag gcc cag	3699
Thr Asn Leu Pro Gly Ile Leu Val Leu Gly Leu Ala Lys Ala Gln	
1220 1225 1230	
ctc att cag atc ttc ttc ttc cgc ctc aac ctc ctg atc act ctg	3744
Leu Ile Gln Ile Phe Phe Phe Arg Leu Asn Leu Leu Ile Thr Leu	
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Leu Gly Leu Leu His Gly Leu Val Phe Leu Pro Val Ile Leu Ser	
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tac gtg ggg cct gac gtt aac ccg gct ctg gca ctg gag cag aag	3834
Tyr Val Gly Pro Asp Val Asn Pro Ala Leu Ala Leu Glu Gln Lys	
1265 1270 1275	
cgg gct gag gag gcg gtg gca gca gtc atg gtg gcc tct tgc cca	3879
Arg Ala Glu Glu Ala Val Ala Ala Val Met Val Ala Ser Cys Pro	
1280 1285 1290	
aat cac ccc tcc cga gtc tcc aca gct gac aac atc tat gtc aac	3924
Asn His Pro Ser Arg Val Ser Thr Ala Asp Asn Ile Tyr Val Asn	
1295 1300 1305	
cac agc ttt gaa ggt tct atc aaa ggt gct ggt gcc atc agc aac	3969
His Ser Phe Glu Gly Ser Ile Lys Gly Ala Gly Ala Ile Ser Asn	
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<211> 1332

<212> PRT

<213> Homo sapiens

<400> 4

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Cys	Ala	Phe	Tyr	Asp	Glu	Cys	Gly	Lys	Asn	Pro	Glu	Leu	Ser	Gly	Ser	35	40	45
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Lys	Ile	Thr	Gly	Asp	His	Leu	Ile	Leu	Leu	Gln	Lys	Ile	Cys	Pro	Arg	65	70	75
Leu	Tyr	Thr	Gly	Pro	Asn	Thr	Gln	Ala	Cys	Cys	Ser	Ala	Lys	Gln	Leu	85	90	95
Val	Ser	Leu	Glu	Ala	Ser	Leu	Ser	Ile	Thr	Lys	Ala	Leu	Leu	Thr	Arg	100	105	110
Cys	Pro	Ala	Cys	Ser	Asp	Asn	Phe	Val	Asn	Leu	His	Cys	His	Asn	Thr	115	120	125
Cys	Ser	Pro	Asn	Gln	Ser	Leu	Phe	Ile	Asn	Val	Thr	Arg	Val	Ala	Gln	130	135	140
Leu	Gly	Ala	Gly	Gln	Leu	Pro	Ala	Val	Val	Ala	Tyr	Glu	Ala	Phe	Tyr	145	150	155
Gln	His	Ser	Phe	Ala	Glu	Gln	Ser	Tyr	Asp	Ser	Cys	Ser	Arg	Val	Arg	165	170	175
Val	Pro	Ala	Ala	Ala	Thr	Leu	Ala	Val	Gly	Thr	Met	Cys	Gly	Val	Tyr	180	185	190
Gly	Ser	Ala	Leu	Cys	Asn	Ala	Gln	Arg	Trp	Leu	Asn	Phe	Gln	Gly	Asp	195	200	205
Thr	Gly	Asn	Gly	Leu	Ala	Pro	Leu	Asp	Ile	Thr	Phe	His	Leu	Leu	Glu	210	215	220
Pro	Gly	Gln	Ala	Val	Gly	Ser	Gly	Ile	Gln	Pro	Leu	Asn	Glu	Gly	Val	225	230	235
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Ala	Arg	Cys	Asn	Glu	Ser	Gln	Gly	Asp	Asp	Val	Ala	Thr	Cys	Ser	Cys
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Gln	Asp	Cys	Ala	Ala	Ser	Cys	Pro	Ala	Ile	Ala	Arg	Pro	Gln	Ala	Leu
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Ile	Ile	Leu	Cys	Ser	Val	Phe	Ala	Val	Val	Thr	Ile	Leu	Leu	Val	Gly
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Phe	Arg	Val	Ala	Pro	Ala	Arg	Asp	Lys	Ser	Lys	Met	Val	Asp	Pro	Lys
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Lys	Gly	Thr	Ser	Leu	Ser	Asp	Lys	Leu	Ser	Phe	Ser	Thr	His	Thr	Leu
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Leu	Gly	Gln	Phe	Phe	Gln	Gly	Trp	Gly	Thr	Trp	Val	Ala	Ser	Trp	Pro
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Leu	Thr	Ile	Leu	Val	Leu	Ser	Val	Ile	Pro	Val	Val	Ala	Leu	Ala	Ala
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Gly	Leu	Val	Phe	Thr	Glu	Leu	Thr	Thr	Asp	Pro	Val	Glu	Leu	Trp	Ser
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Glu	Arg	Leu	Arg	His	Leu	Gln	Val	Trp	Ser	Pro	Glu	Ala	Gln	Arg	Asn
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Ile	Ser	Leu	Gln	Asp	Ile	Cys	Tyr	Ala	Pro	Leu	Asn	Pro	Asp	Asn	Thr
465					470					475					480

Ser	Leu	Tyr	Asp	Cys	Cys	Ile	Asn	Ser	Leu	Leu	Gln	Tyr	Phe	Gln	Asn
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Trp	Ser	Arg	Val	Met	Val	Asp	Ser	Lys	Ala	Thr	Leu	Gly	Leu	Gly	Gly
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Val	Ala	Val	Val	Leu	Gly	Ala	Val	Met	Ala	Ala	Met	Gly	Phe	Phe	Ser
		675					680					685			
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	690					695					700				

Leu 705	Val	Leu	Ser	Val	Gly 710	Ala	Asp	Asn	Ile	Phe 715	Ile	Phe	Val	Leu	Glu 720
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Glu	Leu	Pro	Pro 820	Pro	Gly	Gln	Gly	Glu 825	Gly	Leu	Leu	Leu	Gly 830	Phe	Phe
Gln	Lys	Ala 835	Tyr	Ala	Pro	Phe	Leu 840	Leu	His	Trp	Ile	Thr 845	Arg	Gly	Val
Val 850	Leu	Leu	Leu	Phe	Leu	Ala 855	Leu	Phe	Gly	Val	Ser 860	Leu	Tyr	Ser	Met
Cys 865	His	Ile	Ser	Val	Gly 870	Leu	Asp	Gln	Glu 875	Leu	Ala	Leu	Pro	Lys	Asp 880
Ser	Tyr	Leu	Leu	Asp 885	Tyr	Phe	Leu	Phe	Leu 890	Asn	Arg	Tyr	Phe	Glu 895	Val
Gly	Ala	Pro	Val 900	Tyr	Phe	Val	Thr	Thr 905	Leu	Gly	Tyr	Asn	Phe 910	Ser	Ser
Glu	Ala	Gly 915	Met	Asn	Ala	Ile	Cys 920	Ser	Ser	Ala	Gly	Cys 925	Asn	Asn	Phe
Ser 930	Phe	Thr	Gln	Lys	Ile	Gln 935	Tyr	Ala	Thr	Glu	Phe 940	Pro	Glu	Gln	Ser

Tyr	Leu	Ala	Ile	Pro	Ala	Ser	Ser	Trp	Val	Asp	Asp	Phe	Ile	Asp	Trp	945	950	955	960
Leu	Thr	Pro	Ser	Ser	Cys	Cys	Arg	Leu	Tyr	Ile	Ser	Gly	Pro	Asn	Lys	965	970	975	
Asp	Lys	Phe	Cys	Pro	Ser	Thr	Val	Asn	Ser	Leu	Asn	Cys	Leu	Lys	Asn	980	985	990	
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His	Lys	Tyr	Leu	Pro	Trp	Phe	Leu	Asn	Asp	Arg	Pro	Asn	Ile	Lys	1010	1015	1020		
Cys	Pro	Lys	Gly	Gly	Leu	Ala	Ala	Tyr	Ser	Thr	Ser	Val	Asn	Leu	1025	1030	1035		
Thr	Ser	Asp	Gly	Gln	Val	Leu	Ala	Ser	Arg	Phe	Met	Ala	Tyr	His	1040	1045	1050		
Lys	Pro	Leu	Lys	Asn	Ser	Gln	Asp	Tyr	Thr	Glu	Ala	Leu	Arg	Ala	1055	1060	1065		
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Pro	Gly	Thr	Asp	Pro	Ala	Phe	Glu	Val	Phe	Pro	Tyr	Thr	Ile	Thr	1085	1090	1095		
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Phe	Met	Leu	Ser	Leu	Cys	Leu	Val	Pro	Thr	Phe	Ala	Val	Ser	Cys	1115	1120	1125		
Leu	Leu	Leu	Gly	Leu	Asp	Leu	Arg	Ser	Gly	Leu	Leu	Asn	Leu	Leu	1130	1135	1140		
Ser	Ile	Val	Met	Ile	Leu	Val	Asp	Thr	Val	Gly	Phe	Met	Ala	Leu	1145	1150	1155		

Trp Asp Ile Ser Tyr Asn Ala Val Ser Leu Ile Asn Leu Val Ser
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1190 1195 1200

Ala Thr Ile Ser Met Gly Ser Ala Val Phe Ala Gly Val Ala Met
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Thr Asn Leu Pro Gly Ile Leu Val Leu Gly Leu Ala Lys Ala Gln
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Leu Ile Gln Ile Phe Phe Phe Arg Leu Asn Leu Leu Ile Thr Leu
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Leu Gly Leu Leu His Gly Leu Val Phe Leu Pro Val Ile Leu Ser
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Tyr Val Gly Pro Asp Val Asn Pro Ala Leu Ala Leu Glu Gln Lys
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Arg Ala Glu Glu Ala Val Ala Ala Val Met Val Ala Ser Cys Pro
1280 1285 1290

Asn His Pro Ser Arg Val Ser Thr Ala Asp Asn Ile Tyr Val Asn
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His Ser Phe Glu Gly Ser Ile Lys Gly Ala Gly Ala Ile Ser Asn
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<212> DNA

<213> Rattus sp.

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gcctccttca gtacttccag aacaaccgca ccctcctgat gctcacggcc aaccagactc 180
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<211> 896
<212> DNA
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<210> 8
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Ile Pro Ala Ala Ala Ser Leu Ala Val Gly Ser Met Cys Gly Val Tyr	
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Gly Ser Ala Leu Cys Asn Ala Gln Arg Trp Leu Asn Phe Gln Gly Asp	
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Thr Gly Asn Gly Leu Ala Pro Leu Asp Ile Thr Phe His Leu Leu Glu	
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cgc Arg	cct Pro	tct Ser 275	ttc Phe	tac Tyr	atg Met	ggg Gly	cga Arg 280	atg Met	cca Pro	ggc Gly	tgg Trp	ctg Leu 285	gct Ala	ctc Leu	atc Ile	864
atc Ile 290	atc Ile	ttc Phe	act Thr	gct Ala	gtc Val	ttt Phe 295	gta Val	ttg Leu	ctc Leu	tct Ser	gtt Val 300	gtc Val	ctt Leu	gtg Val	tat Tyr	912
ctc Leu 305	cga Arg	gtg Val	gct Ala	tcc Ser	aac Asn 310	agg Arg	aac Asn	aag Lys	aac Asn	aag Lys 315	aca Thr	gca Ala	ggc Gly	tcc Ser	cag Gln 320	960
gaa Glu	gcc Ala	ccc Pro	aac Asn	ctc Leu 325	cct Pro	cgt Arg	aag Lys	cgc Arg	aga Arg 330	ttc Phe	tca Ser	cct Pro	cac His	act Thr 335	gtc Val	1008
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gcc Ala 385	cct Pro	aaa Lys	agc Ser	caa Gln	gcc Ala 390	cgg Arg	aaa Lys	gaa Glu	aag Lys	gct Ala 395	ttc Phe	cat His	gac Asp	gag Glu	cat His 400	1200
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agg Arg	tcc Ser	agc Ser	tac Tyr 420	aag Lys	tac Tyr	gac Asp	tcc Ser	ctg Leu 425	ctg Leu	cta Leu	ggg Gly	ccc Pro	aag Lys 430	aac Asn	ttc Phe	1296
agt Ser	ggg Gly	atc Ile 435	cta Leu	tcc Ser	ctg Leu	gac Asp	ttg Leu 440	ctg Leu	cag Gln	gag Glu	ctg Leu	ttg Leu 445	gag Glu	cta Leu	cag Gln	1344

gag Glu 450	aga Arg	ctt Leu	cga Arg	cac His	ctg Leu	caa Gln 455	gtg Val	tgg Trp	tcc Ser	cat His	gag Glu 460	gca Ala	cag Gln	cgc Arg	aac Asn	1392
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agc Ser	ctc Leu	act Thr	gac Asp	tgc Cys 485	tgt Cys	gtc Val	aac Asn	agc Ser	ctc Leu 490	ctt Leu	caa Gln	tac Tyr	ttc Phe	cag Gln 495	aac Asn	1488
aac Asn	cac His	aca Thr	ctc Leu 500	ctg Leu	ctg Leu	ctc Leu	aca Thr	gcc Ala 505	aat Asn	cag Gln	act Thr	ctg Leu 510	aat Asn	ggc Gly	cag Gln	1536
acc Thr	tcc Ser	ctg Leu 515	gtg Val	gac Asp	tgg Trp	aag Lys	gac Asp 520	cat His	ttc Phe	ctc Leu	tac Tyr	tgt Cys 525	gcc Ala	aat Asn	gcc Ala	1584
cct Pro 530	ctc Leu	acg Thr	tac Tyr	aaa Lys	gat Asp	ggc Gly 535	aca Thr	gcc Ala	ctg Leu	gcc Ala 540	ctg Leu	agc Ser	tgc Cys	ata Ile	gct Ala	1632
gac Asp 545	tac Tyr	ggg Gly	gca Ala	cct Pro	gtc Val 550	ttc Phe	ccc Pro	ttc Phe	ctt Leu 555	gct Ala 555	gtt Val	ggg Gly	ggc Gly	tac Tyr	caa Gln 560	1680
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aat Asn	aac Asn	tac Tyr	ccc Pro 580	gct Ala	gat Asp	gat Asp	ccc Pro	cgc Arg 585	atg Met	gcc Ala	cac His	gcc Ala 590	aag Lys	ctc Leu	tgg Trp	1776
gag Glu	gag Glu	gct Ala 595	ttc Phe	ttg Leu	aag Lys	gaa Glu	atg Met 600	caa Gln	tcc Ser	ttc Phe	cag Gln	aga Arg 605	agc Ser	aca Thr	gct Ala	1824
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atc Ile 625	aat Asn	cgc Arg	act Thr	acc Thr	atc Ile 630	cag Gln	gac Asp	ctg Leu	cct Pro	gtc Val 635	ttt Phe	gcc Ala	atc Ile	agc Ser	tac Tyr 640	1920
ctt Leu	atc Ile	gtc Val	ttc Phe	ctg Leu 645	tac Tyr	atc Ile	tcc Ser	ctg Leu 650	gcc Ala 650	ctg Leu	ggc Gly	agc Ser	tac Tyr	tcc Ser 655	aga Arg	1968
tgg Trp	agc Ser	cga Arg	gtt Val 660	gcg Ala	gtg Val	gat Asp	tcc Ser	aag Lys 665	gct Ala	act Thr	ctg Leu	ggc Gly 670	cta Leu	ggt Gly	ggg Gly	2016

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Ser	Glu	Ala	Ile	Cys	Phe	Phe	Leu	Gly	Ala	Leu	Thr	Ser	Met	Pro	Ala	
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Val	Arg	Thr	Phe	Ala	Leu	Thr	Ser	Gly	Leu	Ala	Ile	Ile	Phe	Asp	Phe	
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Leu	Leu	Gln	Met	Thr	Ala	Phe	Val	Ala	Leu	Leu	Ser	Leu	Asp	Ser	Lys	
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agg	cag	gag	gcc	tct	cgc	ccc	gac	gtc	gtg	tgc	tgc	ttt	tca	agc	cga	2448
Arg	Gln	Glu	Ala	Ser	Arg	Pro	Asp	Val	Val	Cys	Cys	Phe	Ser	Ser	Arg	
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Arg	Lys	Ile	Tyr	Thr	Pro	Phe	Leu	Leu	His	Arg	Phe	Ile	Arg	Pro	Val	
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gag gca ggc atg aac gcc att tgc tct agt gca ggc tgt gag agc ttc Glu Ala Gly Met Asn Ala Ile Cys Ser Ser Ala Gly Cys Glu Ser Phe 915 920 925	2784
tcc cta acc cag aaa atc cag tat gcc agt gaa ttc cct aat cag tct Ser Leu Thr Gln Lys Ile Gln Tyr Ala Ser Glu Phe Pro Asn Gln Ser 930 935 940	2832
tat gtg gct att gct gca tcc tcc tgg gta gat gac ttc atc gac tgg Tyr Val Ala Ile Ala Ala Ser Ser Trp Val Asp Asp Phe Ile Asp Trp 945 950 955 960	2880
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	1115					1120					1125				
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Tyr	Leu	Leu	Leu	Gly	Leu	Asp	Ile	Arg	Ser	Gly	Ile	Leu	Asn	Leu	
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Val	Trp	Gly	Ile	Ser	Tyr	Asn	Ala	Val	Ser	Leu	Ile	Asn	Leu	Val	
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Met	Thr	Asn	Phe	Pro	Gly	Ile	Leu	Ile	Leu	Gly	Phe	Ala	Gln	Ala	
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Gln	Leu	Ile	Gln	Ile	Phe	Phe	Phe	Arg	Leu	Asn	Leu	Leu	Ile	Thr	
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Leu	Leu	Gly	Leu	Leu	His	Gly	Leu	Val	Phe	Leu	Pro	Val	Val	Leu	
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Lys	Leu	Ala	Thr	Glu	Ala	Ala	Met	Val	Ser	Glu	Pro	Ser	Cys	Pro	
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Gln	Tyr	Pro	Phe	Pro	Ala	Asp	Ala	Asn	Thr	Ser	Asp	Tyr	Val	Asn	
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Tyr	Gly	Phe	Asn	Pro	Glu	Phe	Ile	Pro	Glu	Ile	Asn	Ala	Ala	Ser	
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 Thr Phe Tyr Glu Glu Cys Gly Lys Asn Pro Glu Leu Ser Gly Gly Leu
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 Thr Ser Leu Ser Asn Ile Ser Cys Leu Ser Asn Thr Pro Ala Arg His
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 Val Thr Gly Asp His Leu Ala Leu Leu Gln Arg Val Cys Pro Arg Leu
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 Tyr Asn Gly Pro Asn Asp Thr Tyr Ala Cys Cys Ser Thr Lys Gln Leu
 85 90 95
 Val Ser Leu Asp Ser Ser Leu Ser Ile Thr Lys Ala Leu Leu Thr Arg
 100 105 110
 Cys Pro Ala Cys Ser Glu Asn Phe Val Ser Ile His Cys His Asn Thr
 115 120 125
 Cys Ser Pro Asp Gln Ser Leu Phe Ile Asn Val Thr Arg Val Val Gln
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 Arg Asp Pro Gly Gln Leu Pro Ala Val Val Ala Tyr Glu Ala Phe Tyr
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 Gln Arg Ser Phe Ala Glu Lys Ala Tyr Glu Ser Cys Ser Arg Val Arg
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 Ile Pro Ala Ala Ala Ser Leu Ala Val Gly Ser Met Cys Gly Val Tyr
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Thr	Pro	Cys	Asn	Glu	Ser	Gln	Gly	Glu	Asp	Ser	Ala	Ala	Cys	Ser	Cys
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Gln	Asp	Cys	Ala	Ala	Ser	Cys	Pro	Val	Ile	Pro	Pro	Pro	Pro	Ala	Leu
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Glu	Ala	Pro	Asn	Leu	Pro	Arg	Lys	Arg	Arg	Phe	Ser	Pro	His	Thr	Val
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Phe	Gly	Pro	Phe	Phe	Arg	Thr	Asn	Gln	Ile	Phe	Val	Thr	Ala	Lys	Asn
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Ile	Ser	Leu	Gln	Asp	Ile	Cys	Tyr	Ala	Pro	Leu	Asn	Pro	His	Asn	Thr
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Leu	Ile	Val	Phe	Leu	Tyr	Ile	Ser	Leu	Ala	Leu	Gly	Ser	Tyr	Ser	Arg
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Trp	Ser	Arg	Val	Ala	Val	Asp	Ser	Lys	Ala	Thr	Leu	Gly	Leu	Gly	Gly			
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Val	Ala	Val	Val	Leu	Gly	Ala	Val	Val	Ala	Ala	Met	Gly	Phe	Tyr	Ser			
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Tyr	Leu	Gly	Val	Pro	Ser	Ser	Leu	Val	Ile	Ile	Gln	Val	Val	Pro	Phe			
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Gly	Arg	Thr	Leu	Gly	Ser	Val	Ala	Pro	Ser	Met	Leu	Leu	Cys	Ser	Leu			
			740					745					750					
Ser	Glu	Ala	Ile	Cys	Phe	Phe	Leu	Gly	Ala	Leu	Thr	Ser	Met	Pro	Ala			
		755					760					765						
Val	Arg	Thr	Phe	Ala	Leu	Thr	Ser	Gly	Leu	Ala	Ile	Ile	Phe	Asp	Phe			
	770					775					780							
Leu	Leu	Gln	Met	Thr	Ala	Phe	Val	Ala	Leu	Leu	Ser	Leu	Asp	Ser	Lys			
785					790					795					800			
Arg	Gln	Glu	Ala	Ser	Arg	Pro	Asp	Val	Val	Cys	Cys	Phe	Ser	Ser	Arg			
				805					810						815			
Asn	Leu	Pro	Pro	Pro	Lys	Gln	Lys	Glu	Gly	Leu	Leu	Leu	Cys	Phe	Phe			
			820					825					830					
Arg	Lys	Ile	Tyr	Thr	Pro	Phe	Leu	Leu	His	Arg	Phe	Ile	Arg	Pro	Val			
		835					840					845						
Val	Leu	Leu	Leu	Phe	Leu	Val	Leu	Phe	Gly	Ala	Asn	Leu	Tyr	Leu	Met			
	850					855					860							
Cys	Asn	Ile	Ser	Val	Gly	Leu	Asp	Gln	Asp	Leu	Ala	Leu	Pro	Lys	Asp			
865					870					875					880			

Ser Tyr Leu Ile Asp Tyr Phe Leu Phe Leu Asn Arg Tyr Leu Glu Val
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Ser Leu Thr Gln Lys Ile Gln Tyr Ala Ser Glu Phe Pro Asn Gln Ser
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Tyr Val Ala Ile Ala Ala Ser Ser Trp Val Asp Asp Phe Ile Asp Trp
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Lys Asp Glu Phe Cys Pro Ser Thr Asp Thr Ser Phe Asn Cys Leu Lys
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Asn Cys Met Asn Arg Thr Leu Gly Pro Val Arg Pro Thr Thr Glu Gln
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Phe His Lys Tyr Leu Pro Trp Phe Leu Asn Asp Thr Pro Asn Ile
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Arg Cys Pro Lys Gly Gly Leu Ala Ala Tyr Arg Thr Ser Val Asn
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His Lys Pro Leu Arg Asn Ser Gln Asp Phe Thr Glu Ala Leu Arg
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Ala Ser Arg Leu Leu Ala Ala Asn Ile Thr Ala Glu Leu Arg Lys
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Val Pro Gly Thr Asp Pro Asn Phe Glu Val Phe Pro Tyr Thr Ile
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Ser Asn Val Phe Tyr Gln Gln Tyr Leu Thr Val Leu Pro Glu Gly
 1100 1105 1110

Ile	Phe	Thr	Leu	Ala	Leu	Cys	Phe	Val	Pro	Thr	Phe	Val	Val	Cys
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Tyr	Leu	Leu	Leu	Gly	Leu	Asp	Ile	Arg	Ser	Gly	Ile	Leu	Asn	Leu
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Leu	Ser	Ile	Ile	Met	Ile	Leu	Val	Asp	Thr	Ile	Gly	Leu	Met	Ala
1145						1150					1155			
Val	Trp	Gly	Ile	Ser	Tyr	Asn	Ala	Val	Ser	Leu	Ile	Asn	Leu	Val
1160						1165					1170			
Thr	Ala	Val	Gly	Met	Ser	Val	Glu	Phe	Val	Ser	His	Ile	Thr	Arg
1175						1180					1185			
Ser	Phe	Ala	Val	Ser	Thr	Lys	Pro	Thr	Arg	Leu	Glu	Arg	Ala	Lys
1190						1195					1200			
Asp	Ala	Thr	Ile	Phe	Met	Gly	Ser	Ala	Val	Phe	Ala	Gly	Val	Ala
1205						1210					1215			
Met	Thr	Asn	Phe	Pro	Gly	Ile	Leu	Ile	Leu	Gly	Phe	Ala	Gln	Ala
1220						1225					1230			
Gln	Leu	Ile	Gln	Ile	Phe	Phe	Phe	Arg	Leu	Asn	Leu	Leu	Ile	Thr
1235						1240					1245			
Leu	Leu	Gly	Leu	Leu	His	Gly	Leu	Val	Phe	Leu	Pro	Val	Val	Leu
1250						1255					1260			
Ser	Tyr	Leu	Gly	Pro	Asp	Val	Asn	Gln	Ala	Leu	Val	Leu	Glu	Glu
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Lys	Leu	Ala	Thr	Glu	Ala	Ala	Met	Val	Ser	Glu	Pro	Ser	Cys	Pro
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Gln	Tyr	Pro	Phe	Pro	Ala	Asp	Ala	Asn	Thr	Ser	Asp	Tyr	Val	Asn
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Tyr	Gly	Phe	Asn	Pro	Glu	Phe	Ile	Pro	Glu	Ile	Asn	Ala	Ala	Ser
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Ser Ser Leu Pro Lys Ser Asp Gln Lys Phe
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 Ala Glu Ala Gly Leu Arg Gly Trp Leu Leu Trp Ala Leu Leu Leu Arg
 5 10 15

ttg gcc cag agt gag cct tac aca acc atc cac cag cct ggc tac tgc 155
 Leu Ala Gln Ser Glu Pro Tyr Thr Thr Ile His Gln Pro Gly Tyr Cys
 20 25 30

gcc ttc tat gac gaa tgt ggg aag aac cca gag ctg tct gga agc ctc 203
 Ala Phe Tyr Asp Glu Cys Gly Lys Asn Pro Glu Leu Ser Gly Ser Leu
 35 40 45

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tca Ser	ctg Leu	gaa Glu 100	gcg Ala	agt Ser	ctg Leu	tcg Ser	atc Ile 105	acc Thr	aag Lys	gcc Ala	ctc Leu	ctc Leu	acc Thr	cgc Arg	tgc Cys	395
cca Pro 115	gcc Ala	tgc Cys	tct Ser	gac Asp	aat Asn	ttt Phe 120	gtg Val	aac Asn	ctg Leu	cac His 125	tgc Cys	cac His	aac Asn	acg Thr	tgc Cys	443
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ggc Gly 210	aat Asn	ggg Gly	ctg Leu	gcc Ala	cca Pro 215	ctg Leu	gac Asp	atc Ile	acc Thr	ttc Phe 220	cac His	ctc Leu	ttg Leu	gag Glu	cct Pro 225	731
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cgt Arg	tgc Cys	aat Asn 245	gag Glu	tcc Ser	caa Gln	ggg Gly	gac Asp 250	gac Asp	gtg Val	gcg Ala	acc Thr	tgc Cys	tcc Ser 255	tgc Cys	caa Gln	827
gac Asp	tgt Cys 260	gct Ala	gca Ala	tcc Ser	tgt Cys	cct Pro	gcc Ala 265	ata Ile	gcc Ala	cgc Arg	ccc Pro	cag Gln 270	gcc Ala	ctc Leu	gac Asp	875

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Ile	Leu	Cys	Ser	Val	Phe	Ala	Val	Val	Thr	Ile	Leu	Leu	Val	Gly	Phe	
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Arg	Val	Ala	Pro	Ala	Arg	Asp	Lys	Ser	Lys	Met	Val	Asp	Pro	Lys	Lys	
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ggc	acc	agc	ctc	tct	gac	aag	ctc	agc	ttc	tcc	acc	cac	acc	ctc	ctt	1067
Gly	Thr	Ser	Leu	Ser	Asp	Lys	Leu	Ser	Phe	Ser	Thr	His	Thr	Leu	Leu	
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Thr	Ile	Leu	Val	Leu	Ser	Val	Ile	Pro	Val	Val	Ala	Leu	Ala	Ala	Gly	
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ctg	gtc	ttt	aca	gaa	ctc	act	acg	gac	ccc	gtg	gag	ctg	tgg	tcg	gcc	1211
Leu	Val	Phe	Thr	Glu	Leu	Thr	Thr	Asp	Pro	Val	Glu	Leu	Trp	Ser	Ala	
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ccc	aac	agc	caa	gcc	cgg	agt	gag	aaa	gct	ttc	cat	gac	cag	cat	ttc	1259
Pro	Asn	Ser	Gln	Ala	Arg	Ser	Glu	Lys	Ala	Phe	His	Asp	Gln	His	Phe	
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His	Ile	Ser	Val	Gly	Leu	Asp	Gln	Glu	Leu	Ala	Leu	Pro	Lys	Asp	Ser	
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Phe	Thr	Gln	Lys	Ile	Gln	Tyr	Ala	Thr	Glu	Phe	Pro	Glu	Gln	Ser	Tyr	
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Cys Ala Phe Tyr Asp Glu Cys Gly Lys Asn Pro Glu Leu Ser Gly Ser
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Lys Ile Thr Gly Asp His Leu Ile Leu Leu Gln Lys Ile Cys Pro Arg
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205

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Cys Pro Ala Cys Ser Asp Asn Phe Val Asn Leu His Cys His Asn Thr
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Cys Ser Pro Asn Gln Ser Leu Phe Ile Asn Val Thr Arg Val Ala Gln
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Gln His Ser Phe Ala Glu Gln Ser Tyr Asp Ser Cys Ser Arg Val Arg
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Thr Gly Asn Gly Leu Ala Pro Leu Asp Ile Thr Phe His Leu Leu Glu
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Pro Gly Gln Ala Val Gly Ser Gly Ile Gln Pro Leu Asn Glu Gly Val
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Ile Ile Leu Cys Ser Val Phe Ala Val Val Thr Ile Leu Leu Val Gly
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Phe Arg Val Ala Pro Ala Arg Asp Lys Ser Lys Met Val Asp Pro Lys
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Trp Ser Arg Val Met Val Asp Ser Lys Ala Thr Leu Gly Leu Gly Gly
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Tyr Leu Gly Ile Arg Ser Ser Leu Val Ile Leu Gln Val Val Pro Phe
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Leu Val Leu Ser Val Gly Ala Asp Asn Ile Phe Ile Phe Val Leu Glu
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Tyr Gln Arg Leu Pro Arg Arg Pro Gly Glu Pro Arg Glu Val His Ile
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Gly Arg Ala Leu Gly Arg Val Ala Pro Ser Met Leu Leu Cys Ser Leu
740 745 750

Ser Glu Ala Ile Cys Phe Phe Leu Gly Ala Leu Thr Pro Met Pro Ala
755 760 765

Val Arg Thr Phe Ala Leu Thr Ser Gly Leu Ala Val Ile Leu Asp Phe
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